

**REMARKS**

Claims 1, 3, 6-10, 13 and 14 are pending in this application. For purposes of expedition, claim 2 has been canceled and its limitations have been incorporated into base claim 1. Claims 1, 9 and 13 have been amended in several particulars for purposes of clarity and brevity in accordance with current Office policy, to further define Applicants' disclosed invention and to assist the Examiner to expedite compact prosecution of the instant application. Accordingly, entry of the foregoing amendments is proper under 37 C.F.R. §1.116(b) because those amendments simply respond to the issues raised in the final rejection, no new issues are raised, no further search is required, and the foregoing amendments are believed to remove the basis of the outstanding rejections and to place all claims in condition for allowance. The foregoing amendments, or explanations, could not have been made earlier because these issues had not previously been raised.

As a preliminary matter, the Examiner has denied consideration and entry of the Office Action issued in Korean Patent Application No. 2003-12101 on December 16, 2004, that was filed in an IDS on October 16, 2006 for reason that such an Office Action was written in Korean and was not in English. According to the Examiner, the foreign references cited in the IDS filed October 16, 2006, i.e., JP 6-252046 and KR 2002-94264 only contain an English translation of an abstract. As a result, a concise statement of relevancy is required. In addition, an English translation of the relevant portions of the Korean Office Action referring to JP 6-252046 and KR 2002-94264 is also required. In response thereto, an English translation of that Korean Office Action is enclosed by way of Supplemental Information Disclosure Statement (IDS) concurrently filed herewith (without fee) along with the English translation of both foreign references, JP 6-252046 and KR 2002-94264. Accordingly, consideration of the Supplemental IDS is respectfully requested.

Claims 2 and 9 have been rejected under 35 U.S.C. §112, first ¶, as failing to comply with the written description requirement. Specifically, the Examiner notes the discrepancy of the average width of polycrystalline silicon grains. In response thereto, claim 2 has been canceled and its limitations have been incorporated into base claim 1 in order to render the rejection moot. Claim 9 has been amended to overcome the rejection.

Claims 1-3 and 13-14 have been rejected under 35 U.S.C. §102(e) as being anticipated

by Jung, U.S. Patent No. 6,825,493. In support of this rejection, the Examiner cites column 9, lines 45067; column 10, lines 25-45; and column 14, lines 1-25 of Jung '493 for allegedly disclosing all features of base claims 1 and 13. While Applicants believe that Jung '493 does not disclose "transversely moving the mask relative to the substrate by a translation distance such that the laser beam is overlappingly irradiated at an overlapping region on the substrate where amorphous silicon and a part of already crystallized polycrystalline silicon are exposed so as to increase an average width of the polycrystalline silicon grains, wherein a width of the overlapping region during crystallization corresponds to the translation distance, and is varied between 0.5  $\mu\text{m}$  and 2  $\mu\text{m}$ " as defined in base claims 1 and 13, base claims 1 and 13 have been amended to incorporate limitations of dependent claim 2 in order to clearly distinguish over Jung '493. For example, when "a width of the overlapping region during crystallization corresponds to the translation distance, and is varied between 0.5  $\mu\text{m}$  and 2  $\mu\text{m}$ ", "an average width of the polycrystalline silicon grains is varied between approximately 0.2  $\mu\text{m}$  and 0.6  $\mu\text{m}$ , and is decreased when the width of the overlapping region on which the laser beam is overlappingly irradiated is decreased".

As discussed in paragraph [0009] of Applicants' specification, the problem as identified by Applicants relates to the deterioration of the mobility of an electric field by a scattering effect during charge transfer if an average width of the polycrystalline silicon grains is small. As a result, polycrystalline silicon grains having an average width of a certain size is important, and is required to obtain superior current characteristics. These problems are remedied by Applicants' sole recognition that, if a laser beam is overlappingly irradiated at an overlapping region on the substrate where amorphous silicon and a part of already crystallized polycrystalline silicon are exposed, and a width of the overlapping region during crystallization is varied between 0.5  $\mu\text{m}$  and 2  $\mu\text{m}$ , the most effective width of polycrystalline silicon grains, that is, from 0.2  $\mu\text{m}$  and 0.6  $\mu\text{m}$ , can be advantageously obtained.

In contrast to Applicants' base claims 1 and 13, as amended, Jung '493 discloses only a conventional sequential lateral solidification (SLC) crystallization method in which a substrate 38, as shown in FIG. 2, is typically moved numerous times such that crystallization is repeated until the mask moves the distance between adjacent light transmitting portions so as to form grains of different sizes. According to Jung '493, there are two embodiments disclosed in FIGs. 6A-6D and FIGs. 7A-7D. As shown in FIGs. 6A-6D, when the mask 130 moves along the lateral grain growth of the grains (see FIG. 6A) in a X-direction by a distance of about 0.7 micrometers (see

column 9, lines 54-55 of Jung '493), the polycrystalline silicon grains will exhibit a width "P" of 12 micrometers (see column 10, lines 8-10 of Jung '493). In the second embodiment shown in FIGs. 7A-7D, when the mask 130 moves in a X-direction by a distance of about 1.7 micrometers (see column 10, lines 40-41 of Jung '493), the resulting grains will exhibit a width of 1.7 micrometers (see column 10, lines 64-65 of Jung '493). In the second embodiment shown in FIGs. 7A-7D, grains are provided with relatively short grain sizes, i.e., only 1.7 micrometers in length; however, such a small size significantly reduces the crystallization process time. See column 11, lines 1-8 of Jung '493.

As previously discussed, there is **no** disclosure from Jung '493 nor is there any teaching or suggestion of the Applicants' claimed "transversely moving the mask relative to the substrate by a translation distance such that the laser beam is overlappingly irradiated at an overlapping region on the substrate where amorphous silicon and a part of already crystallized polycrystalline silicon are exposed so as to increase an average width of the polycrystalline silicon grains," such that, when "a width of the overlapping region during crystallization corresponds to the translation distance, and is varied between 0.5  $\mu$ m and 2  $\mu$ m", "an average width of the polycrystalline silicon grains is varied between approximately 0.2  $\mu$ m and 0.6  $\mu$ m, and is decreased when the width of the overlapping region on which the laser beam is overlappingly irradiated is decreased" as expressly defined in base claims 1 and 13. In addition, Jung '493 does **not** disclose or suggest the distinction between the light transmission portion and the light non-transmission portion of the mask as defined in base claim 13.

Since Jung '493 fails to disclose and suggest key features of Applicants' base claims 1 and 13, Applicants respectfully request that the rejection of claims 1, 3 and 13-14 be withdrawn.

Separately, claims 6-10 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Jung, U.S. Patent No. 6,825,493, as applied to claims 1-3 and 13-14, and further in view of Yang, U.S. Publication No. 2002/0197759 for reasons stated on pages 5-6 of the final Office Action. For reasons discussed previously, Jung '493 does not disclose or suggest features of Applicants' base claims 1 and 13. Moreover, Yang, U.S. Patent Application Publication No. 2002/0197759, as a secondary reference, does not disclose or suggest what the Examiner alleges, that is, the use of a mask provided with at least a light transmission region for passing a laser beam and a laser non-transmission region for blocking the laser beam, wherein the laser transmission region is wider than the laser non-transmission region by more than 1  $\mu$ m, as defined in base claim 6.

In contrast to Applicants' base claim 6, Yang '759 only discloses the use of a completely different mask 100, as shown in FIG. 8, in which two different types of light transmission regions L and M are utilized, each having a tiered echelon formation outline. Namely, as described in paragraph [0067] of Yang '759, the light transmission regions L and M have tier-shaped top and bottom outlines. Each of first light transmission regions L is comprised of first to fourth rectangular-shaped patterns, all having the same width. The second light transmission region M, located between the first light transmission regions L, has rectangular-shaped patterns M1 and M2.

Again, the mask 100 as disclosed by Yang '759 is very different from the mask as defined by Applicants' base claim 6, in which the laser transmission region is wider than the laser non-transmission region by more than 1  $\mu\text{m}$ . In view of these distinctions, Applicants respectfully request that the rejection of claims 6-10 be withdrawn.

In view of the foregoing amendments, arguments and remarks, all claims are deemed to be allowable and this application is believed to be in condition to be passed to issue. Should any questions remain unresolved, the Examiner is requested to telephone Applicants' attorney at the Washington DC office at (202) 216-9505 ext. 232.

In view of the foregoing amendments, arguments and remarks, all claims are deemed to be allowable and this application is believed to be in condition to be passed to issue. Should any questions remain unresolved, the Examiner is requested to telephone Applicants' attorney at the Washington DC office at (202) 216-9505 ext. 232.

To the extent necessary, Applicants petition for an extension of time under 37 CFR §1.136. If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 503333.


Respectfully submitted,

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